

A Conceptual Model for Evaluating Social Business Programs in Medicines

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Abstract

Evaluating social business activities requires thinking about their consequences for a myriad of stakeholders. In many respects, potential side-effects of social business programs are as important as the direct intended consequences. In this paper, we outline a framework for thinking about interventions targeting medicines in health systems. The framework allows us to capture both the value to the business and the value to society and see conditions under which these converge and diverge. The framework developed is intended to help guide the design of measurement approaches that will gauge the success of social business ventures that deliver medicines and other health care products and services to disadvantaged populations.

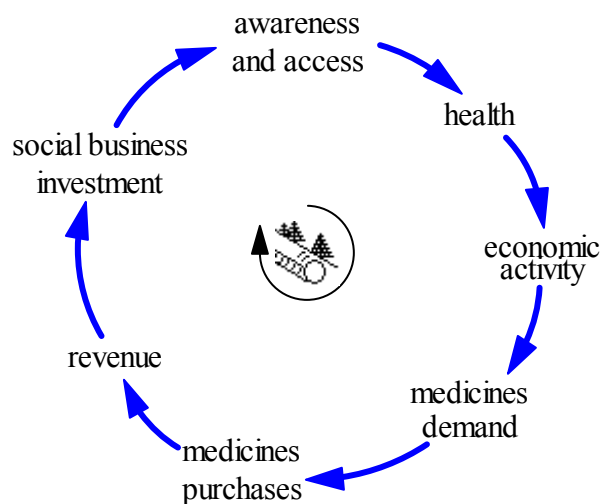
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Summary

Social business programs targeting medicines in lower income countries and regions are a relatively new approach to directly impacting both population health and economic prosperity. To evaluate such programs, it is useful to take a broad perspective looking at why such programs might be expected to work, and what might go wrong and require adjustments. This broad perspective points to the desirability of including more measures than might be included in a traditional medicines-focused study.

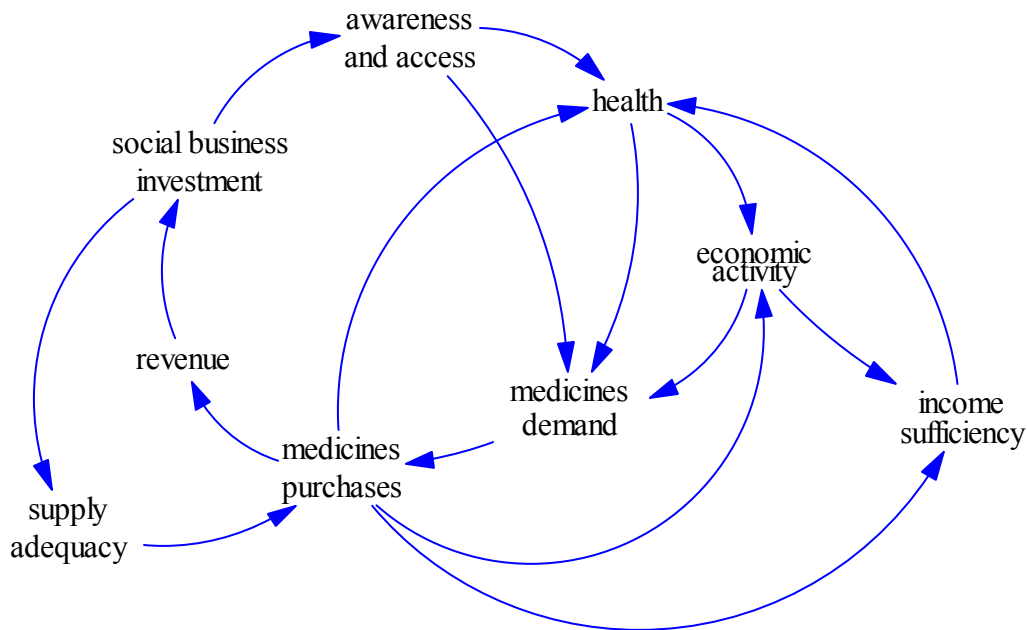
The theory succinctly: Investing in social business programs in the medicines sector improves the health and economic well being of populations, driving commerce, which increases demand, grows business, and allows more investment.

Or, in diagrammatic form:



In evaluating, we are asking if these connections are real, whether they are consistently positive, how strong they are and what other relationships might exist.

Starting from this single loop, we have added the elements that are fundamental to the health and economic well being of the population, alongside the business performance. Diagrammatically we have:



Though we have added a relatively small number of elements, the number of potential paths and interactions has gone up tremendously. By experimenting with the strengths of the various connections we can see some of the different of outcomes that result. Most importantly, we are looking for situations in which there may be divergence between the business and social interests. For example, if there is a weak connection from medicines purchases to health, but a strong connection into medicines demand, medicines purchases (and thus business success) do not translate into better health. This could happen if medicines are inappropriately prescribed or used.

Background

The social business model targets the less advantaged people in developing countries, in order to both sell goods and services and lift the population's socioeconomic status so as to increase longer-term opportunities. A simple diagrammatic representation of the process of growth and its relationship to profit is given by:

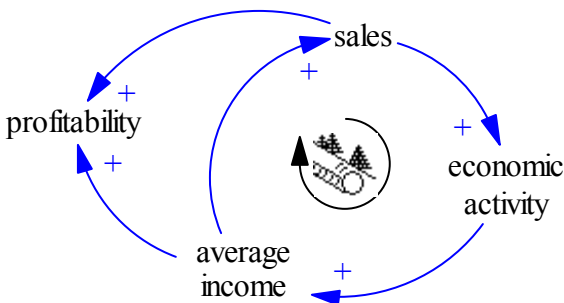


Figure 1: The engine of economic growth and increasing profitability

The feedback loop on the right is often thought of as a pump that generates ever-increasing amounts of income and sales. Interventions can involve priming the pump through investment in infrastructure and other parts of the supply chain, marketing activities and the sales of low price products, all of which strengthen the link between income and sales. The pump analogy is not perfect, but is useful for thinking about growth and how to spur and enable it.

The same idea can be represented in a slightly different way by focusing on the poor and middle class as broad groupings of the people in a society. In this case we have:

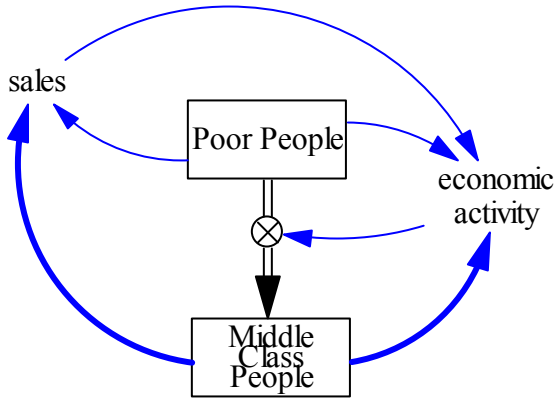


Figure 2: Social business lifting people out of poverty

Here the focus is on moving people from being poor to middle class and the idea is that engaging the poor in commerce provides a mechanism to make this happen more quickly. Investments and pricing models that increase sales to the poor, and programs that increase economic opportunities for the poor, will both facilitate that.

What sets the social business programs of pharmaceutical companies apart from those of most other industries is that they explicitly target not only wealth, but also health. To use the format from Figure 2 we can represent this as:

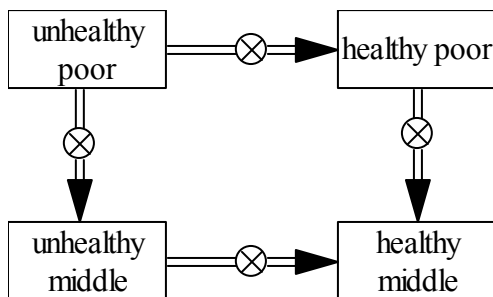


Figure 3: The transition from unhealthy and poor to healthy and not poor

What is interesting about this simple conceptualization is that it captures the natural evolution of development (and the intent of most social business programs) to first increase wealth and have health follow as a natural consequence:

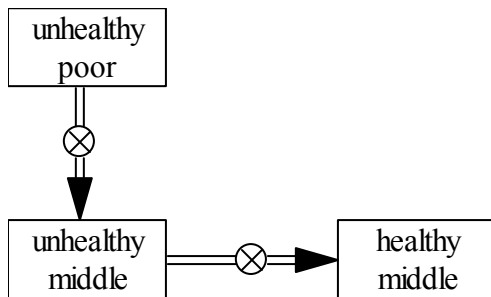


Figure 4: Economic development as a path to health

But this conceptualization also captures the nature of public health initiatives to improve health and have wealth follow as a natural consequence:

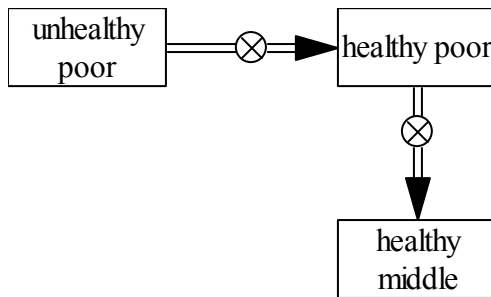


Figure 5: Public health as a path to wealth

The potential for social business programs targeting health in this context is that they can make use of both paths: make people wealthier faster than a pure public health initiatives and make people healthier faster than social business initiatives focused on non-health-related goods.

We are using the terms wealth and health, and making the classification of people into different categories, in a very informal manner. We are not attempting to represent specific populations in this exercise, but simply to define a conceptual framework that will help inform what things are most important to measure in evaluating social business programs in health sectors.

The Determinants of Transitions

Using the diagram shown in Figure 3, we are interested in understanding how a social business program influences the movements between the different categories of people. In formulating the model, we assume that there will be uni-directional progress from one category to another, but that the speed of progress will depend on the nature of the social business program and its interaction with other social institutions. This assumption is not true in general; regions can and do regress both in terms of health and wealth. In the results that we show, a slower movement toward health and wealth can also indicate

the possibility of regression for either of those measures. Note that the results shown should only be thought of as indicative of potential pitfalls or windfalls, not representations of an expected outcome.

To start, we assume that there are 50,000 people, mostly in the poor unhealthy category.² In the model there are no births or deaths (or aging); people only move from one category to another. Including births, deaths and ageing does not change the fundamental nature of the feedback paths identified, but would change the numerical results.

In the absence of any social business program we simulate a baseline against which we will compare the intended program under different assumptions of effectiveness and side effects. The baseline has been set up so there is some movement from unhealthy poor into the other categories. Figure 6 shows the evolution of the distribution of people within the groups. The unhealthy poor are on the bottom, the healthy middle class on top. At the end of 25 years there is substantial migration to unhealthy middle class, limited migration to healthy middle class and a very few people in the healthy poor group.

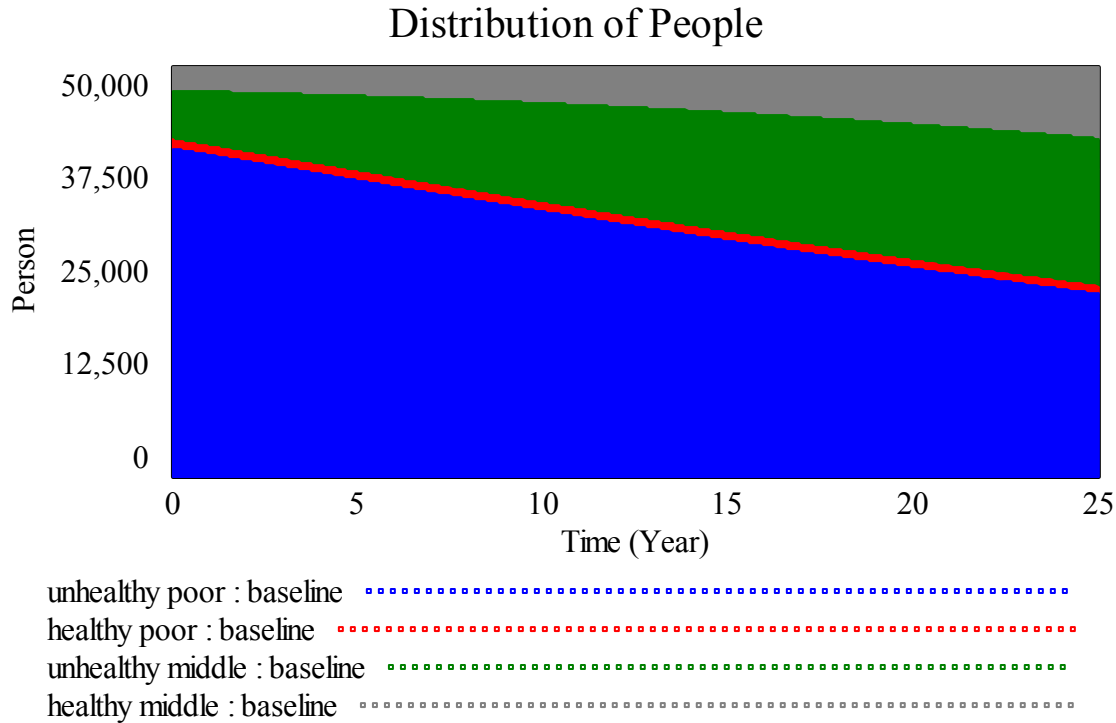


Figure 6: Distribution of people in the baseline scenario

² The model itself requires a variety of assumptions in order to be able to produce numerical results. For brevity, we do not go into those assumptions here, but we are happy to make the computational model available to anyone interested.

Model Structure

Introducing a social business program aimed at medicines and medical access has the potential to change this outcome significantly. We build a model to capture that potential, but be testable under different assumptions on the strength and even direction of the connections between interventions and their consequences. To do this, we delineate the paths by which such interventions will change things. Figure 7 is a compact and simplified representation of the model structure that highlights these paths. The arrows in this diagram are to be interpreted as causal connections between variables. The key determinants of behavior are feedback loops, paths that start from and end in the same variable. There are roughly a dozen feedback loops in this very small diagram, another indication of just how complicated this issue is. We will go through a number of the key feedback loops in turn to discuss their implication for behavior.

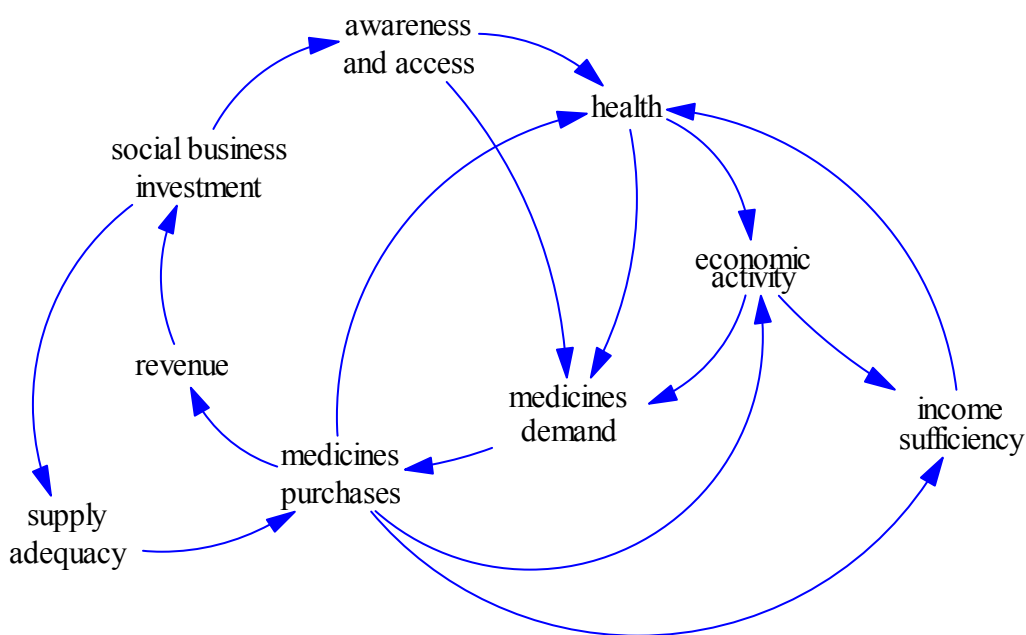


Figure 7: Compact and simplified representation of model structure

If you are unfamiliar with the terminology related to feedback loops an extremely brief introduction may be helpful. Feedback loops result in endogenously generated behavior that causes things to change over time in a manner that is not completely determined by external influences. This is important because changes that affect a feedback loop can cause different behaviors even in the face of the same external stimuli. A simple and pervasive example of this is a heating or cooling system that maintains interior temperature near a setting regardless of outside conditions. Thermostatic control is an example of a negative or balancing feedback loop. Such loops are goal seeking and seek to maintain homeostasis for the variables that make them up. These are to be contrasted with positive or reinforcing feedback loops, in which an effect builds on itself as it completes the loop. A common example of a positive loop would be interest paid on a bank account, which in turn increases the principal in the account. Positive feedback loops tend to cause exponential growth.

Social business programs are expected to be successful based on the belief that figure 7 is dominated by strong positive feedback. Even the innermost loop, as shown in Figure 8, can have this character. At the individual level, one takes medicines to deal with an acute condition or manage a chronic condition and this, in turn, alleviates the condition. This is an example of a balancing loop. At the population level, however, better health keeps people alive longer which leads to more manifestation of chronic conditions which, in turn, can increase the need for medicines. In our computational model this loop is configured to be positive, though not strongly so.

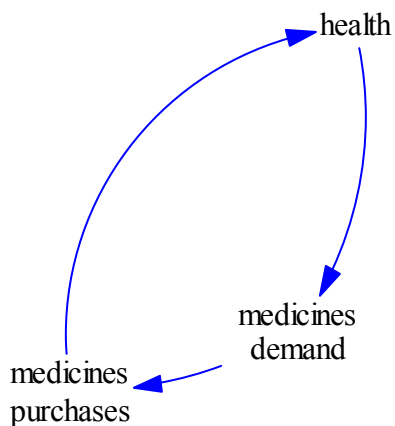


Figure 8: Health and medicines

With so many positive feedback loops there are many mechanisms for growth, and in the way we have presented the causal relationships, growth means an increase in the values of variables. For most of the variables we have discussed, more is better for both society and the business. The exceptions to this are revenue (which goes only to the business) and possibly medicines demand and purchases (should the mix or usage patterns of the medicines not meet population health needs).

Though there are many positive loops involved, they do not guarantee robust growth. The strength, and in some case polarity, of the different feedback loops are dependent on a number of factors. In the model, connection strengths can be altered to explore different potential outcomes.

There is one negative feedback loop shown in Figure 7, as well as a number of implicit negative loops related to diminishing returns and capacity adjustment that are not shown. This loop (potentially a pair of parallel loops) is shown in figure 9.

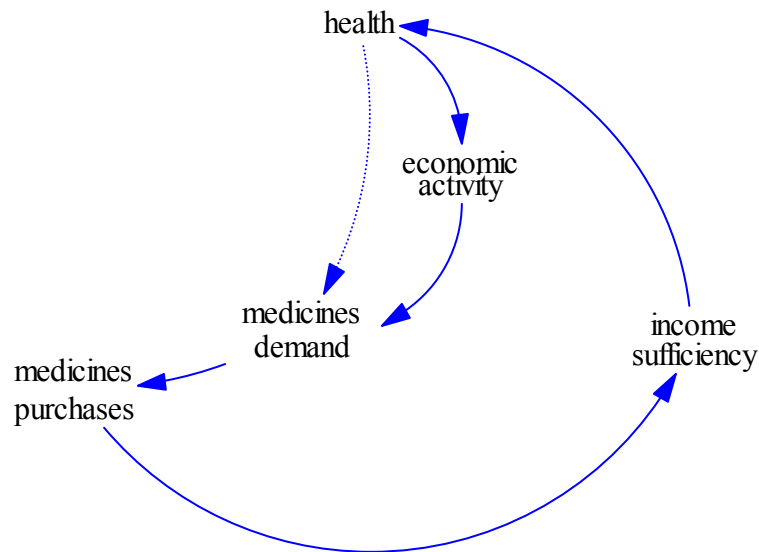


Figure 9: The negative feedback loops in Figure 7

The link from medicines purchases to income sufficiency exists because money spent on medicines is not being spent on something else. If the money is being taken away from food, clean water or access to effective health management alternatives the net effect of the medicines on health will be weakened, or possibly even negative. This would make the positive loops much weaker, as we will discuss below. We note again that the link from health to medicines demand can be either positive or negative. If it is positive, because increasing life expectancy increase chronic disease treatment demand, it is part of the negative loop. If the link is negative, as it would be with a young population struggling with high infectious disease prevalence, the loop going through it is positive.³

Hypothesized Effects of a Social Business Program

Simulating the model as described above with a 20% investment of gross sales revenue into programs for building awareness of health issues and access to care and medicines yield the results shown in Figure 10.

³ This potential for polarity switching suggests that pharmaceutical sales might go up as a program gets started, then go down as infectious diseases are brought under control, then go back up as the population ages. In our simple computational model, which does not track population age, this effect is not observable. It is, however, intriguing and may warrant further investigation.

Distribution of People

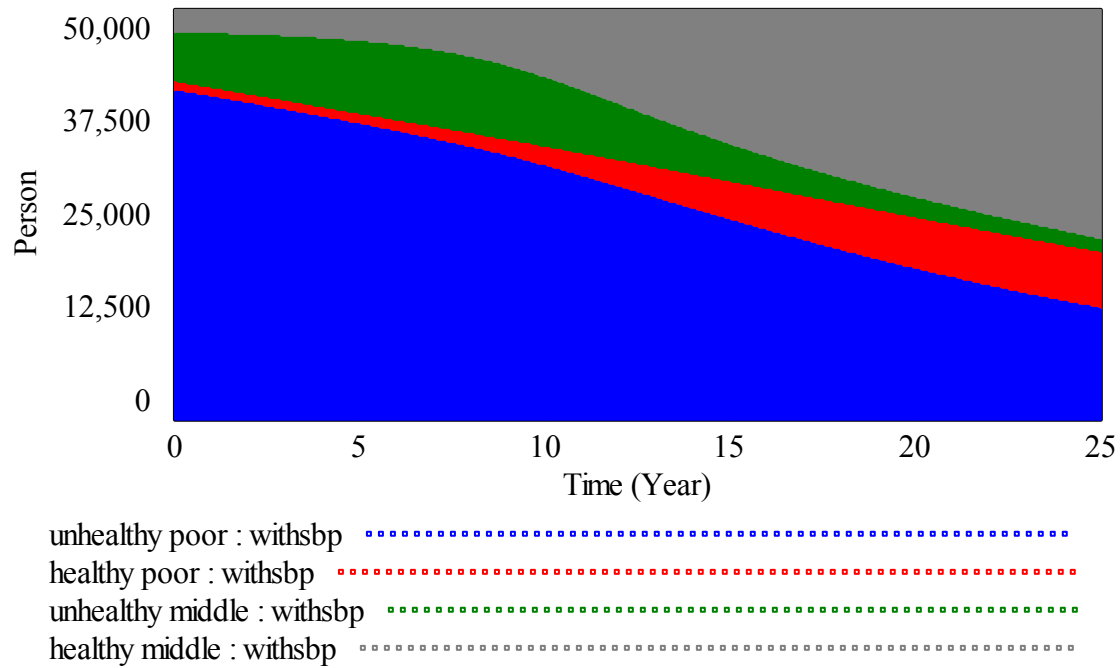


Figure 10: Distribution of people with 20% investment of revenue into a social business program

There are two things in Figure 10 that are important to note. First there is an acceleration of people out of the unhealthy poor group. Second, the unhealthy middle class is now the smallest group at the end of the simulation.

We can also look at the business part of the social business program. Figure 11 compares gross profits between the baseline and social business scenarios.

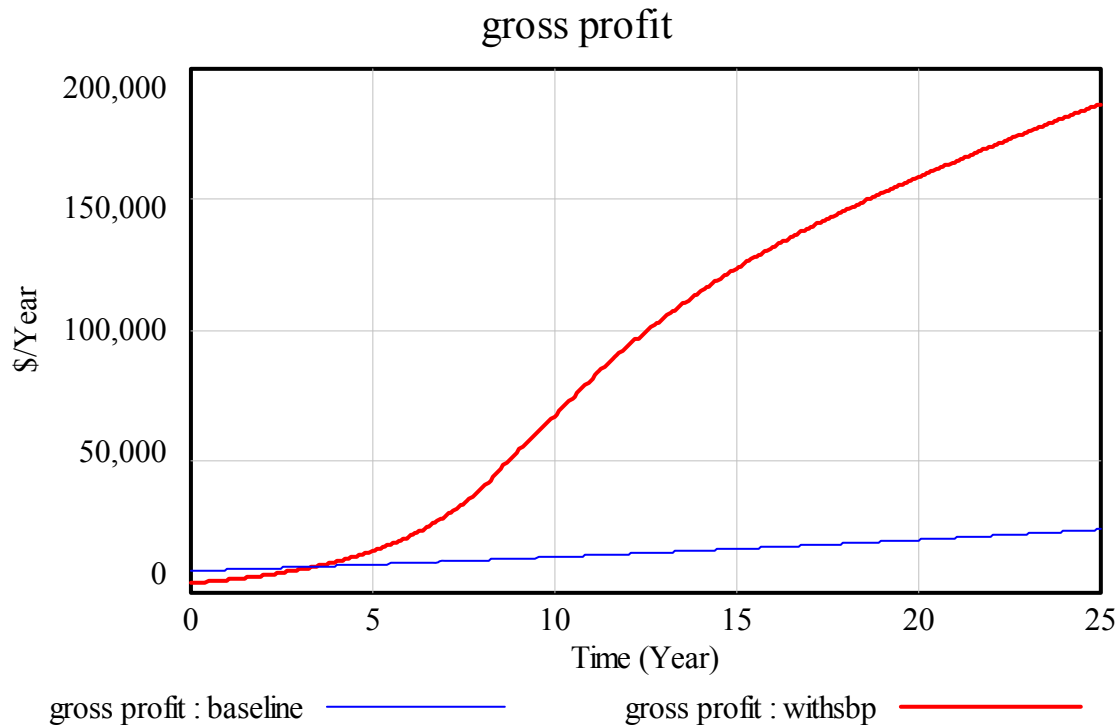


Figure 11: Gross profit in the baseline and social business scenarios

In the beginning profit is lower because money is being diverted to the program initiatives and not the bottom line. After 4 years, the lines cross and there is substantially more profitability with a social business program in place. Again, there is a caveat that the timing of events should not be given too much weight beyond the recognition that things are changing over years, not months or decades.

Ineffective Medicines Use

In this first experiment, the positive feedback loops we outlined in Figure 7 are all working in concert to produce a generally positive outcome. Consider, however, what happens when medicines are inappropriately used, and the traditional healing practice they replace is quite effective. The distribution of population in this case is shown in Figure 12.

Distribution of People

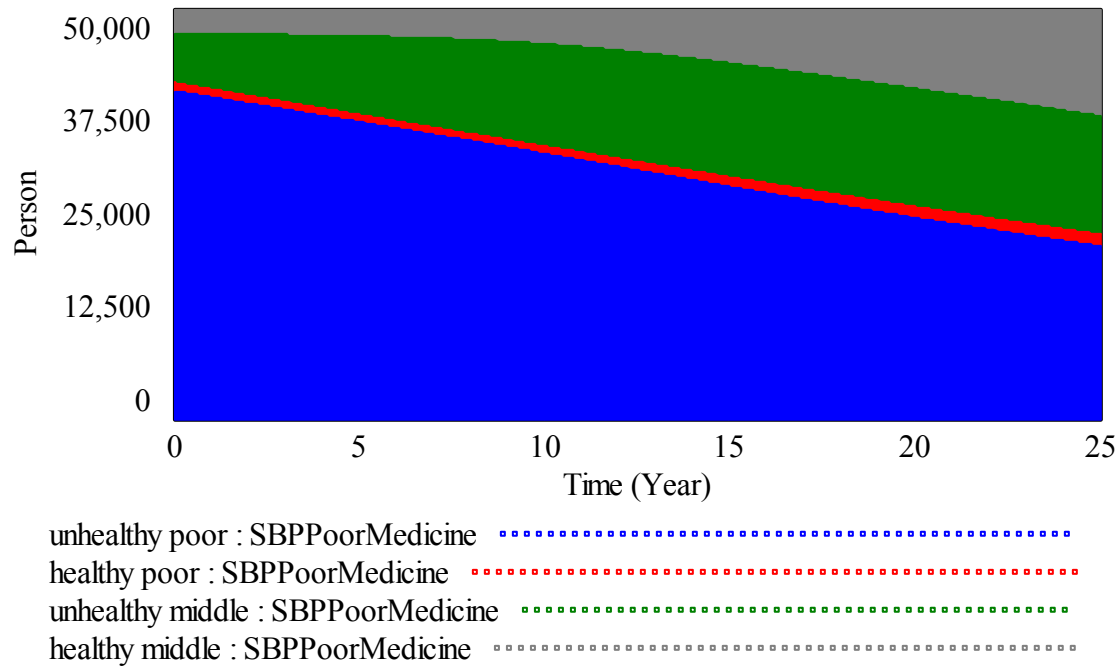


Figure 12: Social business with ineffective medicine use offsetting effective traditional treatment

This looks similar to the baseline and represents a social business program that did very little in aggregate, which is to say that the good done for individuals is only modestly greater than the harm done to individuals. We could easily configure a scenario to do harm in aggregate, but the important observation is what happens to the bottom line for the business in this scenario. This is shown in Figure 13.

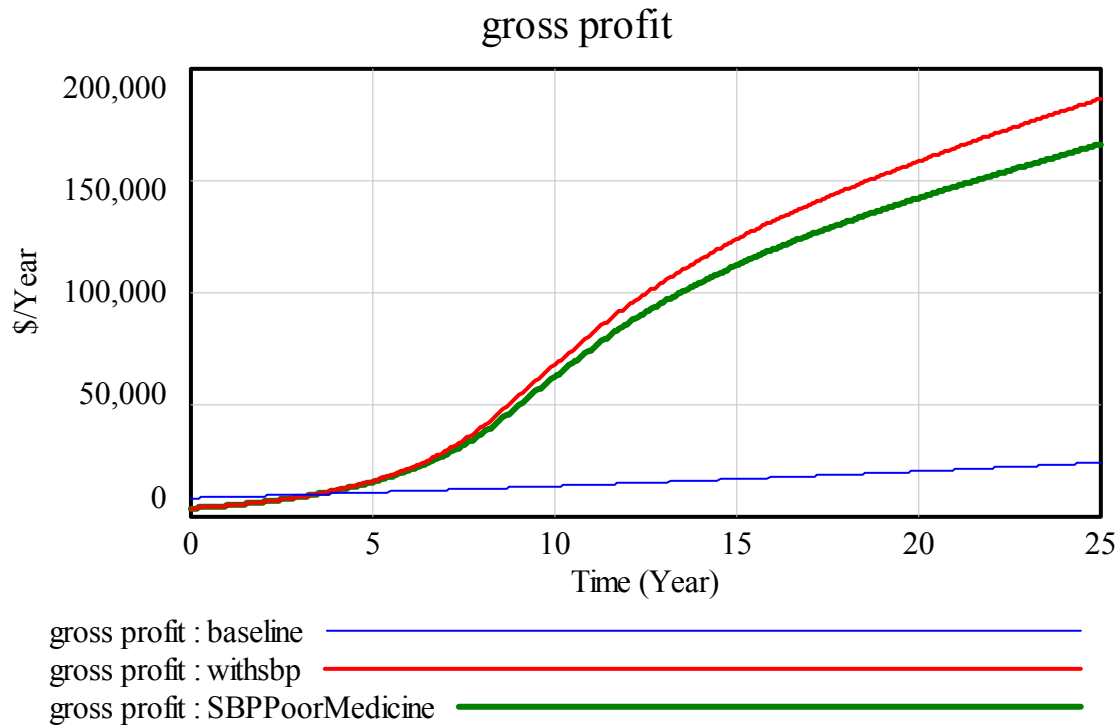


Figure 13: Gross profits with poor medicine effectiveness

While profit is indeed lower than in the case in which everything is working well, the difference is surprisingly small. In the model, there is no reaction of consumers to the efficacy of medicines. Adding such a reaction kills the business growth loop, leaving gross profits to track the baseline except it is lower because of the ongoing spending on the social business program.

It is clear that it is important to measure the effectiveness of medicines use. What the above experiment points to is the importance of people’s ability to perceive this effectiveness. The more people understand the value of medicines, the greater the alignment of social and business performance.

Social Business Program Spending

We have looked at a base case, with no spending on social business programs, and a case in which 20% of revenue is devoted to these programs. There is a spectrum of values that spending can take and, not surprisingly, a point at which increasing investment does not significantly improve results. It is interesting to compare the business and social values of different spending intensities. To do this, consider 6 scenarios with spending at 0, 10, 20, 30, 40 and 50% of revenue. First, just look at the number of poor, unhealthy people as shown in Figure 14. This is one measure of the social value of the intervention.

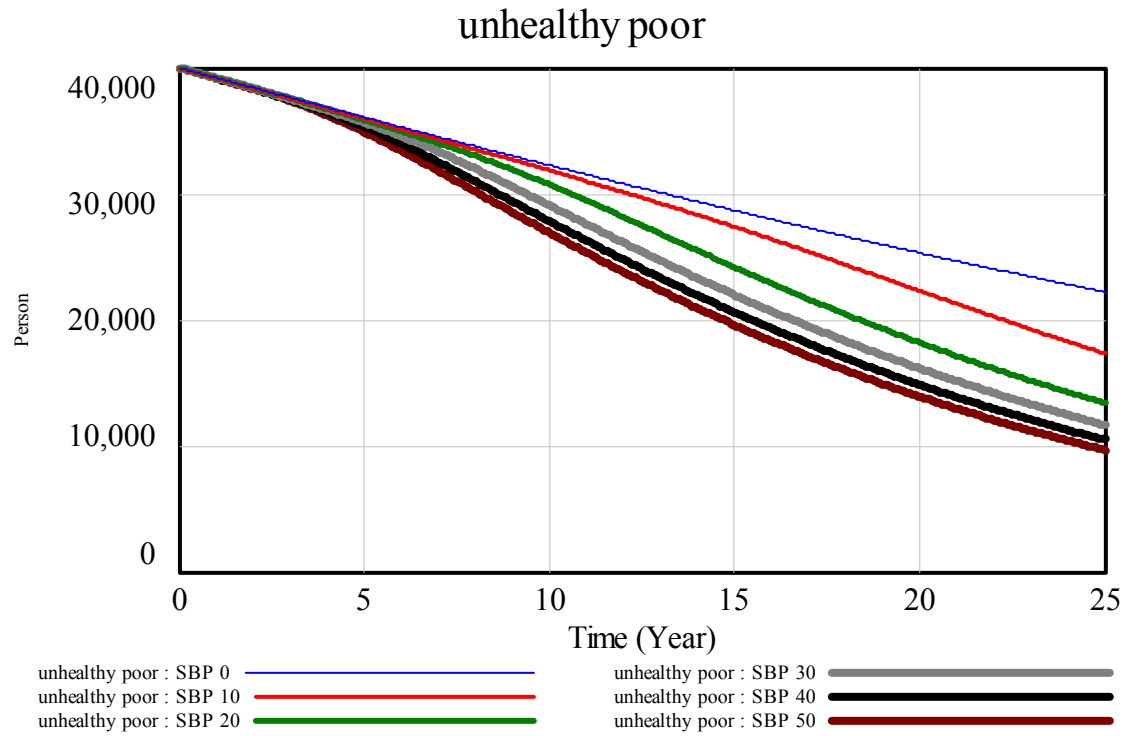


Figure 14: The number of unhealthy poor at different levels of spending

Clearly there are diminishing returns after getting to spending at the 30% level. Now contrast this with the gross profit realized by the company as shown in Figure 15.

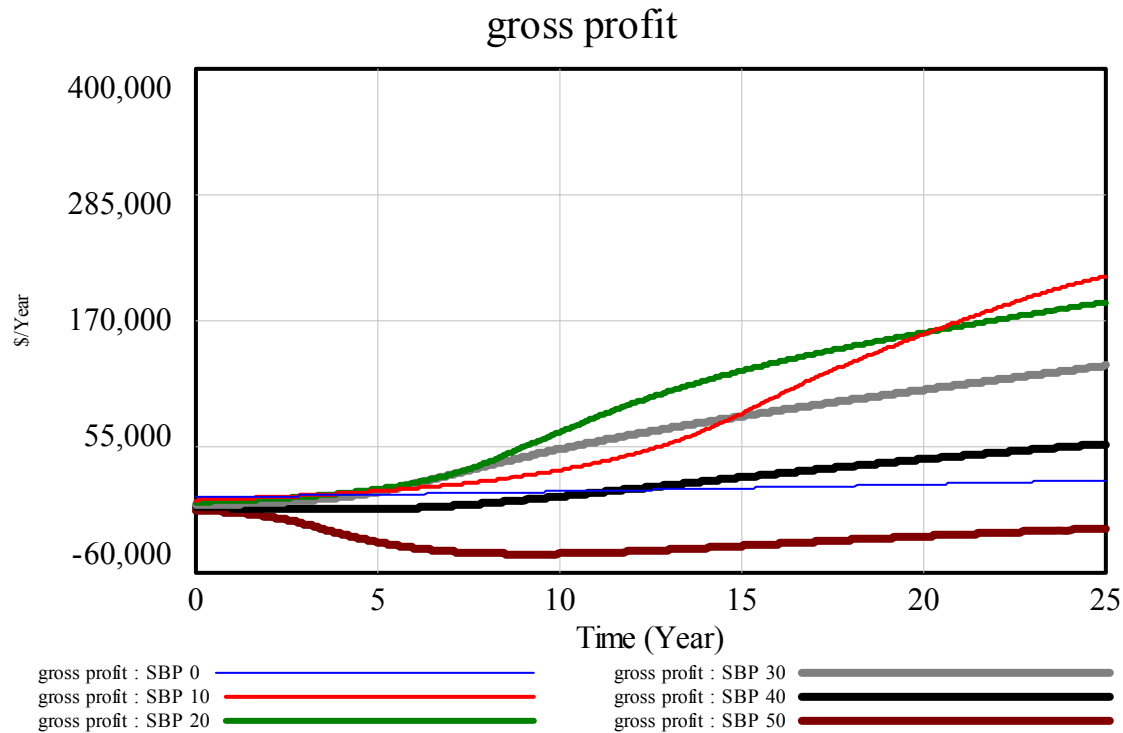


Figure 15: Gross profit at different levels of spending

Because profit is the difference of revenue and cost, the amount of variation is much higher. That is, diminishing returns actually manifest as crossing, as opposed to converging, lines. There are two important things to note. First, in the long run a 10% level of spending returns a higher profit than a 20% level of spending. Second, profit in the 30% run is everywhere lower than in the 20% run. This is significant because the 20% run shows many more people moved out of the unhealthy poor group. That is, there remains significant social benefit to be gained by increasing the program size even though it is not in the interest of the company to do so.

One useful observation is that the greater the market share a company obtains the smaller the divergence between the private and social impacts. This is because with a larger market share, the total amount spent in the social business program is larger. Thus, even though the optimal investment percentage does not change very much for the company, the absolute spending will be large and more people will be moved out of the poor unhealthy population. The virtue of such a market concentration obviously needs to be considered in light of other characteristics of dominant suppliers.

Pricing and Profitability

For simplicity, we did not include the links between price and demand by consumers in the computational model. In the model, if price goes up people simply spend more on the drugs and that does mean they have less to spend on other necessities, which negatively impacts health and slows market expansion. However, because the direct effect from price to demand is not included, it is not

meaningful to run scenarios in which pricing varies. We will simply make the observation that price is a determinant of both medicine use by the population and the market share of suppliers.

Managing the Supply Chain

The results shown assume that the company invests in the supply chain so that medicines are available to people who want them. That assumption is absolutely essential to the results displayed. In the absence of an efficient, revenue-generating delivery mechanism, the results essentially revert to the baseline scenario. How much money needs to be invested and where will depend very much on the nature of local conditions, but doing it right is critical. Fortunately, this is a situation where the fortunes of the company and the social effects are strongly aligned.

Creating Awareness and Demand and Facilitating Access

Awareness of medicines need, medicines demand, and access to medicines are central to the intervention. If money spent generating awareness of symptoms and need for medicines and facilitating access to care and medicines is wasted then nothing happens. Again the business and social results are aligned here.

Moving to Measures

The purpose of this conceptual frame is to help define the universe of areas which should be assessed to evaluate social business programs. The model has not been designed to have variables corresponding directly to measures, but rather to indicate the types of processes and outcomes that should be measured. One important note is that the model deals primarily with averages, making only the very gross distinction between poor and the middle class, healthy and unhealthy. In reality, there is great variation in income and health status. Measures aimed at that inequality, or targeting specific significant subpopulations, are also important in providing an understanding of the impact of social business programs.

Experimenting with this structure points to a number of things that should be measured:

Health: Morbidity and mortality across both acute and chronic diseases and effectiveness of medicines use (appropriateness and adherence) as well as the perception of that effectiveness.

Wealth: Income and material living standards and the way in which they change.

Income Sufficiency: Fraction of income spent on basic necessities; information about budgeting for types of medical care and medicines.

Supply Adequacy: Availability of medicines to the user through different channels.

Medicines Purchases: Use of medicines from companies engaging in social business as well as those that are not.

Revenue: Income in the medicines and medical care professions as well the attractiveness of the medicines market for pharmaceutical companies.

Social business investment: Profiles of who is receiving money and how it is changing behavior among health care professionals, educators and support personnel.

Awareness and access: The ability of people to recognize a need for and get access to health care and their understanding of strategies for disease management the impact of adherence and behavioral changes.